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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/700,975 | 11/04/2003 | Ronald J. Herrin | GP-303138 | 4488 |

7590 06/18/2004

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General Motors Corporation
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P.O. Box 300
Detroit, MI 48265-3000

EXAMINER

ESHETE, ZELALEM

| | |
|----------|--------------|
| ART UNIT | PAPER NUMBER |
|----------|--------------|

3748

DATE MAILED: 06/18/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|-------------------------------|-----------------------------------|--|
| Office Action Summary | Application No. 10/700,975 | Applicant(s) HERRIN, RONALD J. | |
| | Examiner Zelalem Eshete | Art Unit 3748 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1,5,7,8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Irons et al. (5,983,876) in view of Tuttle (SAE 800794).

Regarding claim 1: Irons discloses a method for balancing work output from cylinder banks of an engine having a common crankshaft and separate intake camshafts for each bank (see figures 1,2; column 1, lines 5 to 15); the method comprising: sensing a crankshaft rotational characteristic during the power strokes of pistons of predetermined comparable cylinders of each bank (see numeral 32) and computing average crankshaft rotational characteristics for the power strokes of the comparable cylinders of each bank (see numeral 34,36,42); and adjusting the operating condition of the bank accordingly (see numeral 44).

Irons fails to disclose cam phasers and adjusting the phasing of at least one of the intake camshafts to obtain equal averages of the sensed characteristics of the crankshaft during the power strokes of the respective banks.

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However, Tuttle teaches controlling engine load by means of varying intake valve timing (late intake-valve closing) (see abstract). Tuttle also teaches that late intake-valve-closing engine have (1) lower pumping losses, (2) lower specific fuel consumption, (3) lower nitric oxide emissions (see abstract).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Irons' system by providing engine load control through variable valve timing (phasers) as taught by Tuttle in order to take advantage of late intake-valve-closing engine benefits as taught by Tuttle.

Regarding claim 5: Irons discloses the predetermined comparable cylinders include all the cylinders of each cylinder bank (see numeral 32).

Regarding claim 7: Tuttle discloses the engine is operable with late intake valve closing (see abstract).

Regarding claim 8: Irons discloses the engine is a V-type engine (see figure 1).

3. Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Irons in view of Tuttle as applied to claim 1 above, and further in view of Carey (6,021,758).

Regarding claim 2: Irons in view of Tuttle discloses the claimed invention as recited above; however, fails to disclose the sensed rotational characteristic is crankshaft speed.

However, Carey teaches engine cylinder balancing using sensed engine speed (see abstract).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Irons in view of Tuttle's system by providing engine speed as characteristic as taught by Carey as an alternative means of detecting unbalanced engine.

Regarding claims 3,4: Carey discloses the sensed rotational characteristic is acceleration and position in that he discloses speed; since acceleration is the derivative of speed (velocity) and position is the integral of speed (velocity).

4. Claims 1,6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Irons et al. (5,983,876) in view of Tuttle (SAE 820408).

Irons discloses a method for balancing work output from cylinder banks of an engine having a common crankshaft and separate intake camshafts for each bank (see figures 1,2; column 1, lines 5 to 15); the method comprising: sensing a crankshaft rotational characteristic during the power strokes of pistons of predetermined comparable cylinders of each bank (see numeral 32) and computing average crankshaft

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rotational characteristics for the power strokes of the comparable cylinders of each bank (see numeral 34,36,42); and adjusting the operating condition of the bank accordingly (see numeral 44).

Irons fails to disclose cam phasers and adjusting the phasing of at least one of the intake camshafts to obtain equal averages of the sensed characteristics of the crankshaft during the power strokes of the respective banks.

However, Tuttle teaches controlling engine load by means of varying intake valve timing (early intake-valve closing) (see abstract). Tuttle also teaches that late intake-valve-closing engine have (1) lower pumping losses, (2) lower specific fuel consumption, (3) lower nitric oxide emissions (see abstract).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Irons' system by providing engine load control through variable valve timing (early intake-valve closing) as taught by Tuttle in order to take advantage of early intake-valve-closing engine benefits as taught by Tuttle.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zelalem Eshete whose telephone number is (703) 306-4239. The examiner can normally be reached on Monday to Friday.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas Denion can be reached on (703) 308-2623. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Zelalem Eshete
Examiner
Art Unit 3748

Z


THOMAS DENION
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 3700